

## REMARKS

Claim 1 has been amended for clarification. Claims 2, 4, 5 and 14-20 were previously canceled. Claims 1, 3 and 6-13 are currently pending in this application. Applicants reserve the right to pursue the original and other claims in this and other applications. Applicants respectfully request reconsideration in light of the above amendments and the following remarks.

### Description of the Claimed Invention:

The claimed invention relates to an optical information recording medium (CD-RW) that can undergo direct overwriting at high speeds and has sufficient storage reliability. Claim 1, as amended, recites an “optical information recording medium” comprising a “transparent substrate,” a “recording layer disposed on the transparent substrate,” and a “reflective layer disposed on the recording layer.” Claim 1 also requires that “the optical information recording medium [be] capable of performing, at a linear recording velocity of 28.8 m/s to 33.6 m/s, at least one of recording, erasing and rewriting information by irradiating and scanning with focused light to thereby form and erase recording marks on the recording layer.” Additionally, “the recording layer comprises at least one of alloys and intermetallic compounds each mainly comprising Ga, Ge, Sb, Te and Mn in a compositional ratio represented by the following formula:  $[Ga_xGe_y(Sb_zTe_{1-z})_{1-x-y}]_{1-w}Mn_w$  wherein x, y, z and w each represent an atomic ratio of a positive real number less than 1 and satisfy the following conditions:  $0.02 \leq x \leq 0.06$ ,  $0.01 \leq y \leq 0.06$ ,  $0.815 \leq z \leq 0.86$ ,  $x \geq y$ ,  $x+y \leq 0.1$ , and  $0.01 \leq w \leq 0.04$ .”

The base material for the recording layer is an eutectic composition of SbTe of the formula  $Sb_zTe_{1-z}$  where the ratio z is preferably 0.815 in order to achieve direct overwriting at a speed of 28.8 m/s to 33.6 m/s. Specification, ¶[0037]. The ratio z must also not exceed 0.86 in order to ensure a storage life of 1000 hours or more at 70° C. Specification, ¶[0037]. The recording layer of the invention includes Ga in order to concurrently yield recording at a high speed and easy initialization. Specification, ¶[0041]. The recording layer of the invention includes Ge in order to increase the temperature-dependency of crystallization. Specification, ¶[0042]. This allows the recording medium to have excellent erasing properties at high speed, namely excellent overwriting properties and high stability of recorded marks. Specification, ¶[0042]. The addition of Mn, at an

atomic ratio of, most preferably, 0.01 to 0.04, increases the crystallization rate and decreases the crystallization temperature to thereby improve the direct overwriting properties at high speed and to facilitate the initialization. Specification, ¶[0044].

Rejections Under 35 U.S.C. §§ 102 and 103:

Claims 1, 3, 6-13 stand rejected under 35 U.S.C. §§ 102 and 103 over several prior art references. Each rejection and reference is addressed individually below, however Applicants respectfully submit that, overall, the cited references do not disclose, teach or suggest an optical information recording medium containing a recording layer of the composition recited in claim 1.

Claims 1, 3, 6-9, 12 and 13 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Harigaya et al. (U.S. Patent No. 6,770,346) (“Harigaya ‘346”). This rejection is respectfully traversed and reconsideration is respectfully requested.

Harigaya ‘346 discloses several variations of recording layers including Ga, Ge, Sb, Te and Mn. Harigaya ‘346, Examples 4-9 and 19-26. However, as shown in the table below, none of these examples includes a combination of the materials that satisfies ALL of the requirements of the claimed composition. Specifically, in order to anticipate the claimed invention, Harigaya ‘346 must disclose a single composition  $[Ga_xGe_y(Sb_zTe_{1-z})_{1-x-y}]_{1-w}Mn_w$  wherein the following parameters are met:  $0.02 \leq x \leq 0.06$ ;  $0.01 \leq y \leq 0.06$ ;  $0.815 \leq z \leq 0.86$ ;  $x \geq y$ ;  $x + y \leq 0.1$  and  $0.1 \leq w \leq 0.4$ .

The following table summarizes the examples of Harigaya '346, showing the calculated values of x, y, z and w based on the atomic percentages of  $\alpha$ ,  $\beta$ ,  $\gamma$ ,  $\delta$  and  $\epsilon$ , from the reference.<sup>1</sup>

| Example #:  | Atomic Percentage<br>(from Harigaya '346) |    |      |      |    | Compositional Ratio<br>(to compare to patent claims) |        |        |        |        |
|-------------|---|----|------|------|----|--|--------|--------|--------|--------|
|             | Ga  | Ge | Sb   | Te   | Mn | Ga (x)   | Ge (y) | Sb (z) | Te     | Mn (w) |
| 19          | 4   | 4  | 71   | 17   | 4  | 0.0417   | 0.0417 | 0.8068 | 0.1932 | 0.0400 |
| 20          | 3   | 3  | 73   | 15   | 6  | 0.0319   | 0.0319 | 0.8295 | 0.1705 | 0.0600 |
| 21          | 4   | 3  | 70   | 18   | 5  | 0.0421   | 0.0316 | 0.7955 | 0.2045 | 0.0500 |
| 22          | 2   | 2  | 72   | 16   | 8  | 0.0217   | 0.0217 | 0.8182 | 0.1818 | 0.0800 |
| 23          | 3   | 5  | 76   | 14   | 2  | 0.0306   | 0.0510 | 0.8444 | 0.1556 | 0.0200 |
| 24          | 4   | 2  | 70   | 20   | 4  | 0.0417   | 0.0208 | 0.7778 | 0.2222 | 0.0400 |
| 25          | 2   | 3  | 76   | 14   | 5  | 0.0211   | 0.0316 | 0.8444 | 0.1556 | 0.0500 |
| 26          | 5   | 1  | 66   | 22   | 6  | 0.0532   | 0.0106 | 0.7500 | 0.2500 | 0.0600 |
| 4 through 6 | 3   | 3  | 70.5 | 19.5 | 4  | 0.0313   | 0.0313 | 0.7833 | 0.2167 | 0.0400 |
| 7 through 9 | 2   | 5  | 69   | 18   | 6  | 0.0213   | 0.0532 | 0.7931 | 0.2069 | 0.0600 |

The Examiner asserts, specifically, that Example 23 is bounded by the claims. Office Action at page 4. Applicants respectfully disagree and point out that it is also required that in the claimed invention  $x \geq y$ , which is not the case for Example 23. Similar problems are found with each of the other Examples. Specifically, in Examples 19, 21, 24, 26 and 4-9, z is less than 0.815; in Examples 23, 25 and 7-9, x is not greater than or equal to y; and in Examples 20 and 22, Mn is not present "in an atomic ratio 0.01 to 0.04" (e.g., w>0.04). In order for Harigaya '346 to anticipate claim 1, a combination of the materials that satisfies ALL of the requirements of the claimed composition must be disclosed.

Accordingly, for at least this reason, claim 1 is allowable over Harigaya '346. Claims 3, 6-9, 12 and 13 depend from claim 1 and are allowable along with claim 1. Applicants respectfully request that the rejection be withdrawn and the claims allowed.

Claims 1, 3, 6-9, 12 and 13 stand rejected under 35 U.S.C. § 102(a) as being anticipated by Harigaya et al. (EP 1260973) ("Harigaya EP 1260973"). This rejection is respectfully traversed and reconsideration is respectfully requested.

<sup>1</sup> Applicants respectfully point the Examiner to the Attachment showing the formulas used for the calculation of these values and their derivation.

The present application claims priority to Japanese Patent Application No. 2002-322306, filed November 6, 2002. Acknowledgement of the claim for foreign priority and receipt of a certified copy of the priority document for this application was indicated in the Office Action mailed June 5, 2006. Thus, the priority date for this application is at least November 6, 2002. Applicant is submitting herewith a translation of the priority document supporting entitlement to the November 6, 2002 priority date.

Harigaya '973 is not a valid § 102(a) reference. Harigaya '973 was published on November 27, 2002. However, in light of the fact that the present application claims priority to Japanese Patent Application No. 2002-322306, filed November 6, 2002 (before the publication date of the Harigaya '973 application), and that a certified translation has been submitted, Harigaya '973 may not be applied as a § 102(a) reference against the present application.

Further, Harigaya EP 1260973 is the European equivalent application to the Harigaya '346 patent. Therefore, claims 1, 3, 6-9, 12 and 13 are allowable over Harigaya EP 1260973, for at least the same reasons as discussed above. Applicants respectfully request that the rejection be withdrawn and the claims allowed.

Claims 1, 3 and 6-13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Harigaya et al. (EP 1260973) ("Harigaya EP 1260973"). This rejection is respectfully traversed and reconsideration is respectfully requested.

For at least the reasons stated above, Harigaya '973 is not a valid reference under § 102(a). The publication date of Harigaya '973 is November 27, 2002, which is not one year before the filing date (November 4, 2003) of the present application; therefore, Harigaya '973 is not a valid reference under § 102(b). Further, Harigaya '973 is not a U.S. Patent or Published Application and is therefore not a valid reference under § 102(e). Therefore, Harigaya '973 is not a valid reference as to the present application and cannot be used in a § 103(a) rejection. Accordingly, for at least this reason, Applicants respectfully request that the rejection of claims 1, 3 and 6-13 be withdrawn and the claims allowed.

Claims 1-3, 6-9, 12 and 13 stand rejected under 35 U.S.C. § 103(a)<sup>2</sup> as being unpatentable over Suzuki et al. (JP 2002-347349) (“Suzuki JP 2002-347349”) in view of Takahashi et al. (U.S. Patent No. 6,153,355) (“Takahashi ‘355”). This rejection is respectfully traversed and reconsideration is respectfully requested.

Suzuki JP 2002-347349 is not a valid reference as applied to the present application. As stated above, the present application claims priority to Japanese Patent Application No. 2002-322306, filed November 6, 2002. The publication date of Suzuki JP 2002-347349 is December 4, 2002, which is after the priority date of the present application. Therefore, Suzuki JP 2002-347349 is not a valid reference under § 102(a) or § 102(b). Further, Suzuki JP 2002-347349 is not a U.S. Patent or Published application and is therefore not a valid reference under § 102(e). Therefore, Suzuki JP 2002-347349 is not a valid reference as to the present application and cannot be used in a § 103(a) rejection. Accordingly, for at least this reason, Applicants respectfully request that the rejection of claims 1-3, 6-9, 12 and 13 be withdrawn and the claims allowed.

Claims 1-3, 6-9, 12 and 13 stand rejected under 35 U.S.C. § 103(a)<sup>3</sup> as being unpatentable over Suzuki et al. (JP 2002-096560) (“Suzuki JP 2002-096560”) in view of Takahashi ‘355. This rejection is respectfully traversed and reconsideration is respectfully requested.

Suzuki JP 2002-096560 discloses an optical recording medium with a recording material including Ge, Ga, Sb and Te. Suzuki JP 2002-096560 does not disclose, however, the addition of Mn at an atomic ratio of 0.01 to 0.04. The Examiner asserts that “it would have been obvious to modify the cited examples by add[ing] ... Mn.” Office Action at page 7. Applicants respectfully disagree and submit that it would not have been obvious to add the Mn of Takahashi ‘355 to the optical recording medium of Suzuki JP 2002-096560. The optical recording medium of Suzuki JP 2002-347349 has a very different composition than the thin film of Takahashi ‘335 to which Mn is

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<sup>2</sup> The Office Action states that this is a §102(a) rejection; however, in light of the fact that two references are cited and the Examiner discusses what would have been “obvious,” Applicants assume this was meant to be a 103(a) rejection and have responded as such.

<sup>3</sup> The Office Action states that this is a §102(a) rejection; however, in light of the fact that two references are cited and the Examiner discusses what would have been “obvious,” Applicants assume this was meant to be a 103(a) rejection and have responded as such.

being added. See Suzuki JP 2002-096560, Example 3; Takahashi '335 at col. 8, line 51- col. 9, line 10. It would not have been obvious that the addition of Mn to the optical recording medium of Suzuki JP 2002-096560 would have the same effect as it does in Takahashi '335, since the base material to which Mn would be added is of such different composition.

Accordingly, for at least this reason, claim 1 is allowable over the cited combination. Claims 3, 6-8, 12 and 13 depend from claim 1 and are allowable along with claim 1. Applicants respectfully request the rejection be withdrawn and the claims allowed.

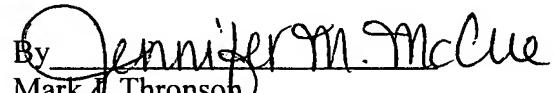
Rejection for Non-Statutory Double Patenting

Claims 1-8 and 10-13 stand rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-17 of Harigaya '346. The Office Action states that the Terminal Disclaimer filed September 22, 2006 is improper. Office Action at page 2. However, Applicants resubmitted a Terminal Disclaimer referring to U.S. Patent No. 6,770,346 on March 12, 2007. A copy of this previously filed Terminal Disclaimer is filed herewith. The Terminal Disclaimer is executed by an attorney of record in the oath. The nonstatutory obviousness-type double patenting rejection should be withdrawn. Payment of the \$130.00 statutory disclaimer fees was previously paid with Applicants' submission dated September 22, 2006. No fee is believed to be due, however the Director is hereby authorized to charge Deposit Account No. 04-1073 for any additional fees required to effect the proper filing of this communication, under Order No. H6790.0004/P004.

In view of the above, Applicants believe the pending application is in condition for allowance.

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Respectfully submitted,

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Attachment: Calculation of values in table on page 7.

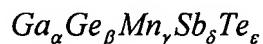
Attachment – Derivation of Chart re: Harigaya References

The x, y, z and w of the claims come from chemical formula  $[Ga_xGe_y(Sb_zTe_{1-z})_{1-x-y}]_{1-w}Mn_w$  where x, y, z, and w are each less than one.

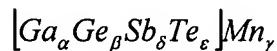
The atomic percentages from the examples in Harigaya '346 comprise  $\alpha$ ,  $\beta$ ,  $\gamma$ ,  $\delta$  and  $\epsilon$  from the chemical formula  $Ga_\alpha Ge_\beta Mn_\gamma Sb_\delta Te_\epsilon$ , where  $\alpha+\beta+\gamma+\delta+\epsilon=100$ .

In order to determine the values of x, y, z and w from the atomic percentages in Harigaya '346, the chemical formula  $Ga_\alpha Ge_\beta Mn_\gamma Sb_\delta Te_\epsilon$  must be converted to the chemical formula  $[Ga_xGe_y(Sb_zTe_{1-z})_{1-x-y}]_{1-w}Mn_w$ .

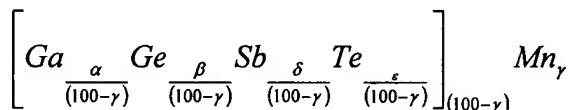
Start with:



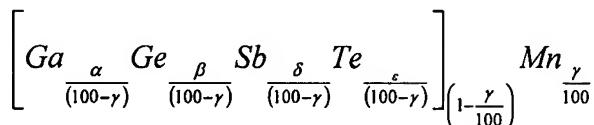
Rearrange to:



Divide out  $(100-\gamma)$  from the bracketed portion:



Divide by 100:



Therefore:

$$w = \frac{\gamma}{100}$$

$$x = \frac{\alpha}{(100-\gamma)}$$

$$y = \frac{\beta}{(100-\gamma)}$$